

ADDENDUM #1

Issue Date: June 2, 2009

**Project Name: WHVA Pathology HVAC Corrections
VA Project #689-08-102**

Project No.: 2008047.00

GENERAL:

Modifications described herein as Addendum items supersede specific parts of the Contract Documents for the above-named project. All bids and the construction contract shall be based on the inclusion of these modifications.

REVISIONS TO DRAWINGS

- ITEM 1: On Drawing #HD1.01, Mechanical Demolition Partial First Floor Plan, **REVISE** per attached sketch SKM-01.
- ITEM 2: On Drawing #H1.01, Mechanical New Work Ductwork and Piping Partial First Floor Plans, **REVISE** per attached sketches SKM-2, SKM-3, SKM-4 and SKM-5.
- ITEM 3: On Drawing #H1.02, Mechanical New Work Partial Third Through Tenth Floor Plans,
- a. **REVISE** “Tenth Floor Partial Roof Plan – West Wing” to “Tenth Floor Partial Floor Plan – West Wing”.
 - b. **CLARIFICATION:** On “Tenth Floor Partial Floor Plan – West Wing”, provide mitered elbows with turning vanes prior to inlet of HEPA filter unit.
 - c. **PROVIDE** duct-mounted static pressure sensor on inlet of HEPA filter unit.
- ITEM 4: On Drawing #H2.01, Mechanical Schedules,
- a. **REVISE** ‘Laboratory Air Valve Schedule’ and **ADD** ‘Ventilation Rate Schedule’ per attached sketch SKM-6.
 - b. In “Sound Attenuator Schedule”, **REVISE** airflow for ‘SATT-4’ to 1000 CFM.
 - c. In “Variable/Constant Air Volume Box Schedule”, **REVISE** the following information for ‘CAV-1’: 500 CFM max., 500 CFM min., 16.5 MBH, 1.7 GPM.
 - d. In “Duct Mounted Hot Water Coil Schedule”, **REVISE** the following information for ‘RH-SA-3’: 1000 CFM, 3.9 GPM, 38.5 MBH.
-

- ITEM 5: On Drawing #H3.01, Mechanical Heating System Flow Schematic and Control Diagrams, "1-AHU-1 and 1-EF-1 Temperature Control Diagram",
- ADD** duct-mounted smoke detector prior to airflow measuring station with BI point.
 - CLARIFICATION:** supply air static pressure sensor shall be located 2/3 downstream of supply air distribution.
 - ADD** pressure sensor on inlet side of general exhaust fan.
- ITEM 6: On Drawing #P1.02, Plumbing New Work Partial First Floor,
- REVISE** the drawing as indicated on sketches #SKP-01, #SKP-02, and #SKP-03.
- ITEM 7: On Drawing #E1.02, Electrical New Power and Signal Partial First Floor Plans, make the following revisions:
- REVISE** the drawing as indicated on sketches #SKE-01 and #SKE-02.
- ITEM 8: On Drawing #E2.01, Electrical Schedules and Details, make the following revisions:
- REVISE** the drawing as indicated on sketch #SKE-03.
- ITEM 9: On Drawing #E2.02, Electrical Riser Diagrams and Details, make the following revisions:
- REVISE** the drawing as indicated on sketch #SKE-04.

REVISIONS TO PROJECT MANUAL

- ITEM 10: In Section #230923, Direct Digital Controls for HVAC Systems, **ADD** attached 'Appendix A'.
- ITEM 11: In Section #221300, Facility Sanitary Sewerage, **ADD** paragraph #2.4,B,
- Type X: Chemical resistant floor drain and "P" trap. Double drainage pattern with integral seepage pan for embedding in floor and weep holes to provide adequate drainage from pan to drain pipe. Floor drain shall be polypropylene, flame retardant, Schedule 40 or 80. Provide outlet of floor drain suitable for properly joining a perforated or slotted floor level grate.
- ITEM 12: In Section #224000, Plumbing Fixtures, paragraphs #2.8,C,2 and #2.8,D,1, **ADD** notation for sink to have an offset drain.

Attachments: Sketches SKM-01 thru SKM-06, SKP-01 thru SKP-03, SKE-01 thru SKE-04.
END OF ADDENDUM

APPENDIX A

1-AHU-1 Air Handling Unit

Type	Name	Description
AI	DA1-P	Discharge Air Static Pressure 1
AI	DA-T	Discharge Air Temperature
AI	FFILT-DP	Final Filter Diff Pressure
AI	OA-F	Outdoor Air Flow
AI	PFILT-DP	PreFilter Diff Pressure
AI	PH-T	Preheat Temperature
AI	RA-H	Space Humidity Sensor
AI	RA-Q	Return Air Quality
BI	DA-SD	Discharge Air Smoke Alarm
BI	LT-A	Low Temperature Alarm
BI	RA-SD	Return Air Smoke Alarm
BI	SF-A	Supply Fan Alarm
BI	SF-S	Supply Fan Status
AO	CLG-O	Cooling Output
AO	OAD-O	Outdoor Air Damper Output
AO	PH-O	Preheat Output
AO	SF-O	Supply Fan Output
BO	SF-C	Supply Fan Command

1-FEF-1 Laboratory Exhaust Fan

AI	EA-P	Exhaust Air Static Pressure
AI	EA-F	Exhaust Air Flow
AI	PFILT-DP	Prefilter Diff Pressure
AI	FFILT-DP	Final Filter Diff Pressure
AO	OAD-O	Outdoor Air Damper Output
AO	EAD-O	Exhaust Air Damper Output
AO	EF-O	Exhaust Fan Output
BO	EF-C	Exhaust Fan Command
BI	EF-A	Exhaust Fan Alarm
BI	EF-S	Exhaust Fan Status

1-EF-1 General Exhaust Fan

AI	EA-P	Exhaust Air Static Pressure
AI	EA-F	Exhaust Air Flow
AO	EAD-O	Exhaust Air Damper Output
AO	EF-O	Exhaust Fan Output
BO	EF-C	Exhaust Fan Command
BI	EF-A	Exhaust Fan Alarm
BI	EF-S	Exhaust Fan Status

HOT WATER SYSTEM

Type	Name	Description
AI	HXLW-T	Heat Exchanger Leaving Water Temperature
AI	HW-DP	Hot Water Differential Pressure
AI	SHW-F	Secondary HW Flow
AI	SHWR-T	Secondary HW Return Temp
AI	SHWS-T	Secondary HW Supply Temp
BI	HWP1-S	HW Pump 1 Status
BI	HWP2-S	HW Pump 2 Status
AO	HWP1-O	HW Pump 1 Output
AO	HWP2-O	HW Pump 2 Output
BO	HWP1-C	HW Pump 1 Command
BO	HWP2-C	HW Pump 2 Command
BO	HWP3-C	HW Pump 3 Command

Radiant Ceiling Panel

Type	Name	Description
AI	ZN-T	Zone Temperature
PAO	HTG-O	Heating Output

1-AHU-1 Air Handling Unit

GENERAL: 1-AHU-1 shall operate to provide conditioned air to the first floor level south wing of Anatomic Pathology. The air handling unit consists of pre-filters and final filters, hot water heating coil, chilled water cooling coil and variable speed supply fan. This system is intended to operate based on a preset occupancy schedule. The system shall operate a stand-by power. Pretreated 100% outdoor is supplied to the unit at 55°F DB temperature.

SUPPLY FAN CONTROL: The variable speed supply fan will be started based on occupancy schedule. When the supply fan status indicates the fan started, the control sequence will be enabled. The supply fan will modulate to maintain the discharge static pressure at setpoint. Upon a loss of airflow, the system will automatically restart. When the supply fan frequency converter fault input is activated, the system will shutdown. When the fault condition clears, the system shall restart as required.

OA CONTROL: The OA damper will open when the unit is in occupied mode.

TEMPERATURE CONTROL: The unit will control to maintain a constant discharge air temperature of 55°F. Space temperature shall range from 70°F-75°F.

OCCUPIED MODE: The occupancy mode will be controlled via a network input. The occupancy mode can also be overridden by a network input or via system override.

UNOCCUPIED MODE: The unit will cycle with outdoor air dampers closed to maintain 55°F space temperature during unoccupied periods.

HEATING COIL: The heating coil will modulate to maintain the temperature setpoint. Upon a loss of airflow, the preheat coil will be commanded to a full open position should the outdoor air temperature fall below the low outdoor air temperature setpoint.

COOLING COIL: The cooling coil will modulate to maintain the temperature setpoint. Upon a loss of airflow, the cooling coil will be off.

SMOKE DETECTION: Upon activation of the unit smoke detectors, the outdoor air damper shall close and the supply fan will be disabled.

HOT WATER SYSTEM

The secondary hot water pumps shall run continuously whenever the outside air temperature is 60°F or less. (user adjustable)

The secondary hot water pumps shall operate in parallel to maintain the pressure difference at the end of the loop of 4-6 psi (adjustable). Provide automatic alteration of the lead pump on a monthly basis. If any pump fails, an alarm report shall be printed at the remote DDC operator terminal.

Lead pump shall start and modulate end of main control valve to maintain end of the loop pressure.

The supply and return hot water temperatures shall be indicated at the head end.

1-EF-1 General Exhaust Fan

General exhaust systems shall operate based on same occupancy schedule set for 1-AHU-1 and shall operate at constant speed. VFD shall be used to establish fan speed. Prior to fan starting, exhaust air damper shall modulate open. Static pressure sensor and air flow measuring station shall provide display at headend.

1-FEF-1 Laboratory Exhaust Fan

Laboratory exhaust system shall operate 24/7 in conjunction with 1-AHU-1 and shall operate at constant speed. VFD shall be used to establish fan speed. Prior to fan starting, exhaust air damper and outdoor air (bypass) damper shall modulate open. Outdoor air damper shall modulate to maintain discharge outlet velocity as sensed by velocity sensor in stack. Differential pressure sensors at filter bank shall alarm and provide display at headend.

RADIANT CEILING PANELS

TEMPERATURE CONTROL: The unit will control to maintain the zone temperature setpoint as sensed by the zone temperature sensor.

OCCUPIED MODE: The occupancy mode will be controlled via a network input.

HEATING COIL: The heating coil will modulate open and close in sequence to maintain the temperature setpoint.

DOCUMENT — ADDENDUM No. 1

**VA Connecticut Healthcare System
Pathology HVAC Corrections
West Haven, Connecticut**

**VA project number – 689-08-102
SLAM Project No. 08024.30**

This Addendum dated June 2, 2009 forms a part of the Contract Documents and modifies the original Bidding Documents dated May 19, 2009. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum is comprised of Page Nos. 1 through 2, and the following attachments:

1. Previously issued Specification Sections, dated May 19, 2009, revised June 2, 2009:
 - a. Document 09 06 00 – Schedule For Finishes
 - b. Document 12 31 00 – Manufactured Metal Casework
 - c. Document 12 31 00 – Manufactured Plastic Casework

1.1 PROJECT MANUAL

- A. Document 09 06 00 – Schedule For Finishes: **DELETE** this Document dated 5/19/09 in its entirety and replace with attached revised Document 09 06 00 – Schedule For Finishes dated 6/2/09.
- B. Document 12 31 00 – Manufactured Metal Casework: **DELETE** this Document dated 5/19/09 in its entirety and replace with attached revised Document 12 31 00 – Manufactured Metal Casework dated 6/2/09.
- C. Document 12 31 00 – Manufactured Plastic Casework: **DELETE** this Document dated 5/19/09 in its entirety and replace with attached revised Document 12 31 00 – Manufactured Plastic Casework dated 6/2/09.
- D. Document 08 71 00 – Door Hardware
 1. Page 08 71 00-3, Article 1.6, **ADD** the following to Paragraph B.1 as follows:

Sargent	Sargent Manuf. Co.	New Haven, CT
Intellikey	Intellikey Corp.	Melbourne, FL
Yale	Yale Commerc. Locks and Hardware	Lenoir City, TN

2. Page 08 71 00-7, Article 2.7, **MODIFY** Paragraph B as follows:

"1. Mortise Lock and Latch Sets: Conform to ANSI/BHMA A156.13.
Mortise Locksets shall be manufactured by SARGENT Manufacturing Corporation Series 8255, New Haven, CT. All lockset functions shall be manufactured in a single sized case formed from 12 gauge steel minimum. The case shall be closed on all sides and back. Lockset shall be 2 3/4" (70 mm) backset, standard, with a one piece 3/4" (19 mm) throw anti-friction stainless steel latch bolt. The deadbolt shall be a full 1" (25mm) throw made of stainless steel and have 2 hardened steel roller inserts. All locksets and latchsets shall have lever handles similar to Falcon S-lever Design. Lever handle shall be fabricated from wrought stainless steel. No substitute lever design or material shall be accepted. Strikes shall be non-handed with a curved lip. To insure proper alignment, all trim, knobs, or levers, shall be thru-bolted and fully interchangeable between rose and escutcheon designs. Mortise lockset shall have a field-adjustable, beveled armored front, with a .125" -1/8" (3mm) thickness minimum."

3. Page 08 71 00-10, Article 2.13, **MODIFY** Paragraph C.1 as follows:

"1. Locks and Latchsets: 626."

1.2 DRAWINGS

- A. Drawing A602 – DOOR AND FRAME SCHEDULE, TYPES, AND DETAILS: **MODIFY** remarks column in door schedule for room 1147 ADP CLOSET to read "REINSTALL INELLIKEY LOCK IN NEW DOOR".
- B. Drawing A602 – DOOR AND FRAME SCHEDULE, TYPES, AND DETAILS: **CHANGE** room name of door 1158 from "DI/STORAGE" to "**STORAGE**".
- C. Drawing A602 – DOOR AND FRAME SCHEDULE, TYPES, AND DETAILS: **CHANGE** hardware set for door 1158 STORAGE from "42" to "**43**".

END OF ADDENDUM No. 1

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VA Project #689-08-102
vZHS Project #2008047.00

SECTION 09 06 00
SCHEDULE FOR FINISHES

PART I - GENERAL

1.1 DESCRIPTION

This section contains a coordinated system in which requirements for materials specified in other sections shown are identified by abbreviated material names and finish codes in the room finish schedule or shown for other locations.

1.2 MANUFACTURERS

Manufacturer's trade names and numbers used herein are only to identify colors, finishes, textures and patterns. Products of other manufacturer's equivalent to colors, finishes, textures and patterns of manufacturers listed that meet requirements of technical specifications will be acceptable upon approval in writing by contracting officer for finish requirements.

1.3 SUBMITALS

Submit in accordance with SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES—provide quadruplicate samples for color approval of materials and finishes specified in this section.

DESIGNER NOTE: See instructions.

1. COLOR SLIDES-INTERIOR VIEWS:

Room Number and Name	Item/View to be Photographed
1.	North, east, south, and west
2.	North, east, south, and west
3.	North, east, south, and west
4.	North, east, south, and west

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1.4 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.

B. MASTER PAINTING INSTITUTE: (MPI)

2001.....Architectural Painting Specification Manual

PART 2- PRODUCTS

2.1 COLOR SLIDES

A. Size 24 x 35 mm.

B. Labeled for:

1. Building name and Number.
2. Room Name and Number.

2.2 DIVISION 08 - OPENINGS

A. SECTION 08 11 13, HOLLOW METAL DOORS AND FRAMES

Paint both sides of door and frames same color including ferrous metal louvers, and hardware attached to door	
Component	Color of Paint Type and Gloss
Door	P3, Level 5
Frame	P2, Level 5

B. SECTION 08 14 00, WOOD DOORS

Component	Finish/Color
Doors	CC1, S1
Frames	P2, Level 5

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C. SECTION 08 31 13, ACCESS DOORS AND FRAMES

Material	Finish/Color
Steel	P (to match adjacent surface)
Stainless steel	Satin

T. WINDOW STOOLS

Room No. and Name	Material	Finish
1160 PA Office 1158 DI/Storage 1152 AP Lab 1150 Supervisor 1149 Microscopy	Wood	P (to match adjacent surface)

U. SECTION 08 71 00, BUILDERS HARDWARE

Item	Material	Finish
Hinges		US26D
Door Closers		US26D
Closer/ Holder		US26D
Lock/ Latches		US26D
Armor Plates	Metal	Satin
Kick Mop Plates	Metal	US26D
Exit Device		US26D

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2.3 DIVISION 09 - FINISHES

A. SECTION 09 30 13, CERAMIC TILING

1. CERAMIC MOSAIC TILE (FT)					
Color	Size	Shape	Pattern	Manufacturer	Mfg. Color Name/No.
?	6x6	square			

2. SECTION 09 30 13, CERAMIC TILING		
Finish code	Manufacturer	Mfg. Color Name/No

B. SECTION 09 51 00, ACOUSTICAL CEILINGS

Finish Code	Component	Color Pattern	Manufacturer	Mfg Name/No.
1AT	Square Lay-in 2x4 <u>2x2</u> Tile	White	Armstrong	Optima Open Plan Square Lay-in, Fine Texture <u>1810 Fine Fissured</u> <u>Square Lay-in</u>
1AT	Exposed Suspension System	White	Armstrong	Prelude
<u>2AT</u>	<u>Square Lay-in 2x2</u> <u>Tile</u>	<u>White</u>	<u>Armstrong</u>	<u>Non-perforated</u> <u>Ceramaguard, Square</u> <u>Lay-in</u>

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<u>2AT</u>	<u>Exposed Suspension System</u>	<u>White</u>	<u>Armstrong</u>	<u>Prelude</u>
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C. SECTION 09 65 19, RESILIENT TILE FLOORING

Finish Code	Size	Material/Component	Manufacturer	Mfg Name/No.
1VCT	12X12	VCT	Mannington	Soldpoint Visual tile, #337 Toasted Sesame

D. SECTION 09 65 16, VINYL SHEET FLOORING, HEAT WELDED SEAMS (WSF)

Finish Code	Pattern name	Manufacturer	Mfg. Color Name/No.
1WSF		Forbo	#6300 Mist

1. SECTION 09 65 16, WELDING RODS (WSF)

Finish code	Manufacturer	Mfg. Color Name/No.
1WSF	Forbo	#6300 Mist

2. SECTION 09 65 16, CAP STRIPS (WSF)

Finish Code	Manufacturer	Mfg. Color Name/No.

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1WSF	Forbo	#6300 Mist

E. SECTION 09 65 13, RESILIENT BASE STAIR TREADS AND ACCESSORIES

Finish Code	Item	Height	Manufacturer	Mfg Name/No.
1RB	Rubber Base (RB)	4"	Roppe	TS 4 Cove Base P194 Burnt Umber

F. SECTION 09 91 00, PAINT AND COATINGS

1. MPI Gloss and Sheen Standards

		Gloss @60	Sheen @85
Gloss Level 1	a traditional matte finish-flat	max 5 units, and	max 10 units
Gloss Level 2	a high side sheen flat-"a velvet-like" finish	max 10 units, and	10-35 units
Gloss Level 3	a traditional "egg-shell like" finish	10-25 units, and	10-35 units
Gloss Level 4	a "satin-like" finish	20-35 units, and	min. 35 units
Gloss Level 5	a traditional semi-gloss	35-70 units	
Gloss Level 6	a traditional gloss	70-85 units	
Gloss level 7	a high gloss	more than 85 units	

2. Paint code	Gloss	Manufacturer	Mfg. Color Name/No.
P1	Level 3	ICI	#2012, Swiss Coffee
P2	Level 4	ICI	#202 Midnite Hour
P3	Level 5	ICI	#366 Ochre Tan

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3. Stain Code (S)	Gloss and Transparency	Manufacturer	Mfg. Color Name/No.
	Semi		
S1	Match Existing Wood Door Color		Match Existing Wood Door Color
4. Clear coatings Code(CC)	Gloss	Manufacturer	Mfg. Color Name/No.
CC1	Match Existing Wood Door Gloss		

2.4 DIVISION 10 - SPECIALTIES

A. SECTION 10 26 00, WALL GUARDS AND CORNER GUARDS

Item	Material	Manufacturer	Mfg. Color Name/No.
Corner Guards	SS	C/S	Match existing
Wall Guards and Handrail	Acrovyn	C/S Acrovyn	Match existing
Wall Guard	Acrovyn	C/S Acrovyn	Match existing

B. SECTION 12 36 00, COUNTERTOPS AND ACCESSORIES

Type	Finish/Color
Plastic Laminate	

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2.7 DIVISION 22 - PLUMBING

A. SECTION 22 40 00, PLUMBING FIXTURES AND TRIM

Item	Color
Water Closet	White
Lavatories	White

PART III EXECUTION

3.1 FINISH SCHEDULES & MISCELLANEOUS ABBREVIATIONS

FINISH SCHEDULE & MISCELLANEOUS ABBREVIATIONS	
Term	Abbreviation
Acoustical Ceiling	AT
Ceramic Mosaic Tile	FTCT
Existing	E
Floor Tile, Mosaic	FT
Gypsum Wallboard	GWB

Material	MAT
Paint	P
Rubber Base	RB
Vinyl Composition Tile	VCT
Vinyl Sheet Flooring (Welded Seams)	WSF

3.2 FINISH SCHEDULE SYMBOLS

Symbol Definition

** Same finish as adjoining walls
 - No color required
 E Existing
 XX To match existing
 EFTR Existing finish to remain

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RM Remove

3.3 ROOM FINISH SCHEDULE

A. Match adjoining or existing similar surfaces colors, textures or patterns where disturbed or damaged by alterations or new work when not scheduled.

B. ROOM FINISH SCHEDULE

Room No. and Name		FLOOR			BASE		WALL		CEILING		REMARKS
1162 Toilet	N E W	MAT	FC		MAT	FCC	MAT	FCC	MAT	FCC	
		FT	1FT	N	FT	FT1	GWB	P1	AT	1AT	
				E	FT	FT1	GWB	P1			
				S	FT	FT1	GWB	P1			
				W	FT	FT1	GWB	P1			
				C							
DI/Storage 1150	N E W	VCT	1VCT	N	<u>RB</u>	<u>1RB</u>	<u>GWB</u>	<u>P1</u>	2AT	2AT	
				E	<u>RB</u>	<u>1RB</u>	<u>GWB</u>	<u>P1</u>			
				S	<u>RB</u>	<u>1RB</u>	<u>GWB</u>	<u>P1</u>			
				W	<u>RB</u>	<u>1RB</u>	<u>GWB</u>	<u>P1</u>			
1160 PA Office	N			N	RB	1RB	GWB	P1			
				E	RB	1RB	GWB	P1			

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1158 Supervisor 1149 Microscopy P01 Passage C01 Corridor	E W	VCT	1VCT	S	RB	1RB	GWB	P1	AT	1AT	
				W	RB	1RB	GWB	P1			
				C							
1152 AP Lab	N E W	WSF	1WSF	N	WSF	1WSF	GWB	P1	AT <u>2AT</u>	1AT <u>2AT</u>	
				E	WSF	1WSF	GWB	P1			
				S	WSF	1WSF	GWB	P1			
				W	WSF	1WSF	GWB	P1			
				C							
1146 Mech	N E W	-	-	N	RB	1RB	GWB	P1	-	-	Seal concrete where existing flooring removed
				E	RB	1RB	GWB	P1			
				S	RB	1RB	GWB	P1			
				W	RB	1RB	GWB	P1			
				C							
1161 Elec 1159 Elec 1147 ADP Closet 1180 DI	E X I S T	E	E	N	E	E	E	P1	-	-	
				E	E	E	E	P1			
				S	E	E	E	P1			
				W	E	E	E	P1			
				C							
1182 Office 1180 Office 1175 Office	E X I S	E	E	N	E	E	GWB	P1	EXIST		Alternate No. 1
				E	E	E	GWB	P1			
				S	E	E	GWB	P1			

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1174 Office	T			W	E	E	GWB	P1		
				C						

--- E N D---

SECTION 12 31 00
MANUFACTURED METAL CASEWORK

PART 1 — DESCRIPTION OF WORK

1.00 SUMMARY AND SCOPE

A. Section Includes:

1. **Kewaunee Scientific Corporation, CONTOUR REDISHIP COLLECTION Laboratory Furniture** - Furnish all cabinets and casework, including tops, ledges, supporting structures. Include delivery to the building, set in place, level, and scribe to walls and floors as required. Furnish and install all filler panels, knee space panels and scribes as shown on drawings.
2. Furnish and deliver all utility service outlet accessory fittings, electrical receptacles and switches identified on drawings as mounted on the laboratory furniture. All plumbing and electrical fittings, not preinstalled in equipment, will be packaged separately and properly marked for delivery to the appropriate contractor.
3. Furnish and deliver, for installation by the mechanical contractor, all laboratory sinks, cup sinks or drains, drain troughs, overflows and sink outlets with integral tailpieces, which occur above the floor, and where these items are part of the equipment. All tailpieces shall be furnished less the couplings required to connect them to the drain piping system.
4. Furnish service strip supports where specified, and setting in place service tunnels, service turrets, supporting structures and reagent racks of the type shown on the drawings.
5. Removal of all debris, dirt and rubbish accumulated as a result of the installation of the laboratory furniture to an onsite container provided by others, leaving the premises broom clean and orderly.

B. Related Divisions:

1. Divisions 5 & 6: Behind-the-Wall Blocking and Studs
2. Division 9: Base Molding
3. Division 11: Chemical Fume Hoods
4. Division 15: Plumbing
5. Division 16: Electrical Fittings and Connections

C. Related Publications:

1. SEFA 3 - Scientific Equipment and Furniture Association
2. SEFA 8 - Scientific Equipment and Furniture Association
3. NFPA 30 - National Fire Protection Association
4. NFPA-45 - National Fire Protection Association
5. UL - Underwriters Laboratories
6. ASTM D552 - Bending Test

1.01 BASIS OF WORK

- A. It is the intent of this specification to use **Kewaunee Scientific Corporation, CONTOUR REDISHIP COLLECTION Laboratory Furniture** as the standard of construction for steel laboratory furniture. The construction standards of this product line shall provide the basis for quality and functional installation.

- B. Supply all equipment in accordance with this specification. The offering of a product differing in materials and construction from this specification requires written approval from the owner/architect. This approval must be obtained seven (7) days before the quotation deadline. Procedures for obtaining approval for an alternate manufacturer are defined in section 2.00.C in this specification.
- C. General Contractors should secure a list of approved laboratory furniture manufacturers from the architect as a protection against non-conformance to these specifications.
- D. Participants in the quotation process have the option of clarifying deviations to the specified design, construction, or materials. Without such clarifications, sealed quotations to the owner or owner representative will be construed as being in total conformance to the requirements of the specification.
- E. The owner / owner representative reserves the right to reject qualified or alternate proposals and to award based on product value where such action assures the owner greater integrity of product.

1.02 QUALITY ASSURANCE

- A. The steel laboratory furniture contractor shall also provide worktops and fume hoods all manufactured or shipped from the same geographic location to assure proper staging, shipment and single source responsibility.
- B. General Performance: Provide certification that furniture shall meet the performance requirements described in SEFA 8.

1.03 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's data and installation instructions for each type of casework. Provide data indicating compliance with SEFA 8.
- B. Samples:
Samples from non-specified manufacturers will be required and reviewed per specification. Samples shall be delivered, at no cost to the architect or owner to a destination set forth by the architect or owner. This must be done seven (7) days before quotation deadline as a condition of approval of each bidder. Samples shall be full size, production type samples. Miniature, or "Show Room" type samples are not acceptable. Furnish the following:
 - 1. One 18" combination (1) drawer and (1) cupboard base unit showing complete construction details, including (1) shelf.
 - 2. One 36" acid storage base cabinet typical of specified elevations.
 - 3. One sample of all top materials shown or called for, of sufficient size to perform finish requirement tests.
 - 4. Sample of all mechanical service fittings, locks, door pulls, hinges, and interior hardware.
- C. Shop Drawings:
Submit shop drawings for furniture assemblies showing plans, elevations, ends, cross-sections, service run spaces, location and type of service

fittings.

1. Coordinate shop drawings with other work involved.
2. Provide roughing-in drawings for mechanical and electrical services when required.

PART 2 — PRODUCTS

2.00 MANUFACTURERS

- A. The basis of this specification is steel casework manufactured according to the standards used by **Kewaunee Scientific Corporation**, 2700 Front Street, Statesville, North Carolina. The specified design is **Contour Rediship Collection**. All laboratory equipment covered by the specification shall be the product of one manufacturer and be fabricated at one geographic location to assure shipping continuity and single-source responsibility. All quotations from a manufacturer other than Kewaunee Scientific Corporation shall contain a review of the following capabilities:
1. List of shop facilities
 2. List of engineering and manufacturing personnel
 3. Proof of financial ability to fulfill the contract
 4. List of a minimum of ten (10) installations over the last five (5) years of comparable scope
 5. Proof of project management and installation capabilities
 6. SEFA member in Good Standing
- B. The selected manufacturer must warrant for a period of one-year starting (date of acceptance or occupancy, whichever comes first) that all products sold under the contract referenced above shall be free from defects in material and workmanship. Purchaser shall notify the manufacturer's representative immediately of any defective product. The manufacturer shall have a reasonable opportunity to inspect the goods. The purchaser shall return no product until receipt by purchaser of written shipping instructions from the manufacturer.
- C. The architect will retain the above samples of the successful manufacturer or owner to insure that material delivered to jobsite conforms in every respect to the samples submitted.

2.01 CABINET STYLE:

Steel:

Cabinet bodies, drawer bodies, shelves, drawer heads and door assemblies shall be fabricated from Cold Rolled Steel. (Note: All Drawer and Door Styles are available)

2.02 DRAWER AND DOOR STYLE:

Contour - Inset - 03 - The outer drawer and door head shall have a channel formation on all four sides to eliminate sharp raw edges of steel and shall be welded and ground smooth. Drawer and door, when closed, shall be recessed to create an overall flush face. Drawer and door pulls shall be an integral contour radiused pull along the top

edge.

2.03 MATERIALS

A. General Requirements:

It is the intent of this specification to provide a high quality steel cabinet specifically designed for the laboratory environment.

B. Steel:

Cold Rolled Steel:

Cold rolled sheet steel shall be prime grade 12, 14, 16, 18 and 20 gauge U.S. Standard; roller leveled, and shall be treated at the mill to be free of scale, ragged edges, deep scratches or other injurious effects.

C. Glass:

Glass used for framed sliding and swinging doors shall be 1/8" float glass. Glass used for unframed sliding doors, shall be 1/4" float glass. Glass used in fume hoods or other hazardous locations shall be 7/32" laminated safety float glass, except the glass shielding fluorescent lights in fume hoods shall be tempered glass to provide greater resistance to heat and impact.

D. Hardware and Trim:

1. Drawer and Door Pulls:

Contour - 5 - (Available for **Contour** style 03 only) - Pull shall be of modern design, offering a comfortable continuous handgrip. Pull shall be integrally formed at top of drawer and door, and grooved in back of drawer head to interlock with drawer body. Use of Aluminum, Steel, or plastic pulls (molded or extruded), or a design not compatible for usage by the handicapped will not be acceptable.

2. Sliding Door Pulls:

Flush pulls for sliding doors shall be aluminum, with clear, lacquer finish, providing a recessed finger grip. Finger holes or slots machined into doors will not be acceptable.

3. Hinges:

Hinges shall be made of Type 304 stainless steel .089 thick, 2-1/2" high, with brushed satin finish, and shall be the institutional type with a five-knuckle bullet-type barrel. Hinges shall be attached to both door and case with two screws through each leaf. Welding of hinges to door or case will not be accepted. Doors under 36" in height shall be hung on one pair of hinges, and doors over 36" high shall be hung on 3 hinges.

4. Locks:

Locks, where shown or called for, shall be a National Lock, 5-disc tumbler with heavy-duty interchangeable cylinder. Exposed lock noses shall be satin nickel plated and stamped with identifying numbers. Locks shall have capacity for 225 primary key changes. Master key one level with the potential of 40 different, non-interchangeable master key groups.

5. Positive Catch:

A two-piece heavy-duty cam action positive catch shall be provided on all base cupboard doors and shall be positioned near the pivoting edge of door to provide a clean unobstructed opening. Main body of

the catch shall be confined within an integral cabinet divider rail, while latching post shall be mounted on the hinge side of door. Nylon roller type catches are not acceptable.

6. Elbow Catches:

Elbow catches and strike plates shall be used on left hand doors of double door cases where locks are used, and are to be burnished cast aluminum, with bright brass finish.

7. Shelf Adjustment Clips:

Shelf adjustment clips shall be nickel-plated steel.

8. Leg Shoes:

Leg shoes shall be provided on all table legs, unless otherwise specified, to conceal leveling device. Shoes shall be a pliable, black vinyl material. Use of a leg shoe, which does not conceal leveling device, will not be acceptable.

9. Base Molding:

Base molding shall be provided by others.

10. Support Rods, Upright Rod Assemblies and Rod Sockets:

Upright rods, cross rods and ring support rods, where specified, shall be anodized Duralumin (2" or 3/4" dia., as required). Rod sockets shall be chrome-plated brass, secured through tabletops with lock nut and spring washer. Rod clamps shall be heavy duty, designed to securely hold rod assembly in any position. Use of wood rod assemblies will not be accepted.

11. Label Holders:

Label holders, where shown or called for, shall be self adhesive type aluminum with satin finish and designed for 2-1/2" x 1-1/8" cards, unless otherwise specified.

12. Number Plates:

Number plates, where shown or called for, shall be self-adhesive type aluminum with indented black lettering.

13. Sink Supports:

Sink supports shall be the hanger type, suspended from top front and top rear horizontal rails of sink cabinet by four 1/4" dia. rods, threaded at bottom end and offset at top to hang from two full length reinforcements welded to the front and rear top rails. Two 3/4" x 1-2/2" x 12 gauge channels shall be hung on the threaded rods to provide an adjustable sink cradle for supporting sinks. When sink capacity exceeds 3,750 cu. in., the sink supports shall be suspended from full-length reinforcements welded to the two end rails. Two 1" x 2" x 10 gauge full-length channels shall be hung from the four 1/4" dia. rods to provide an alternate sink cradle.

14. Support Struts:

Support struts shall consist of two 16 gauge channel uprights fastened top and bottom by two adjustable "U" shaped spreaders, each 12 gauge, 1-1/2" x length required formed from galvanized steel. Struts shall be furnished to support drain troughs, and to support worktop at plumbing space under fume hood superstructures or other heavy loads. Support struts can be furnished with hangers at extra cost when specified, to support mechanical service piping and drain lines.

2.04 CONSTRUCTION

A. Steel Base Cabinet Construction:

1. General:

- a. The steel furniture shall be of modern design and shall be constructed in accordance with the best practices of the Scientific Laboratory Equipment Industry. First class quality casework shall be insured by the use of proper machinery, tools, dies, fixtures and skilled workmanship to meet the intended quality and quantity for the project.
- b. All cabinet bodies shall be flush front construction with intersection of vertical and horizontal case members, such as end panels, top rails, bottoms and vertical posts in same plane without overlap. Exterior corners shall be spot welded with heavy back up reinforcement at exterior corners. All face joints shall be welded and ground smooth to provide a continuous flat plane.
- c. Each cabinet shall be complete so that units can be relocated at any subsequent time without requiring field application of finished ends or other such parts.
- d. Case openings shall be rabbetted on all four sides for both hinged and sliding doors to provide a dust resistant case.
- e. All cabinets shall have a cleanable smooth interior. Bottom edges shall be formed down on sides and back to create easily cleanable corners with no burrs or sharp edges, and front edge shall be offset to create a seamless drawer and door recess rabbet for dust stop.

2. Steel Gauges:

Gauges of steel used in construction of cases shall be 18 gauge, except as follows:

- a. Corner gussets for leveling bolts and apron corner braces, 12 gauge.
- b. Hinge reinforcements, case and drawer suspension channels, 14 gauge.
- c. Top and intermediate front horizontal rails, table aprons and reinforcement gussets, 16 gauge.
- d. Drawer assemblies, door assemblies and adjustable shelves, 20 gauge.

3. Base Cabinets:

- a. End uprights shall be formed into not less than a channel formation at top, bottom, back and front. The front edge shall further offset to form a strike for doors and drawers, and shall be perforated for the support of drawer channels, intermediate rails and hinge screws. An upright filler shall be screwed in place in all cupboard units to close the back of the channel at front of the upright and to provide a smooth interior for the cupboard to facilitate cleaning. The upright filler shall be perforated with shelf adjustment holes at not more than 2" centers painted prior to assembly. The inside front of the upright shall

be further reinforced with a full height 14 gauge hinge reinforcement angle.

- b. Top horizontal rail on base cabinets shall interlock within the flange at top of end panels for strength, but shall be flush as face of unit. Top rail shall have a full width rabbet for swinging doors and drawers. Reinforcements shall be provided at all front corners for additional welded strength between vertical and horizontal case members.
- c. Intermediate rails shall be provided between doors and drawers, but shall not be provided between drawers unless made necessary by locks in drawers. When required, intermediate rails shall be recessed behind doors and drawer fronts, and designed so that security panels may be added as required.
- d. Intermediate vertical uprights shall be furnished to enclose cupboards when used in a unit in combination with a half width bank of drawers. However, to allow storage of large or bulky objects, no upright of any type shall be used at the center of double door cupboard units.
- e. Cabinet bottom, and bottom rail shall be formed of one piece of steel except in corner units and shall be formed down on sides and back to create a square edge transition welded to cabinet end panels, and front edge shall be offset to create a seamless drawer and door recess rabbet for dust stop.
- f. Toe space rail shall extend up and forward to engage bottom rail to form a smooth surfaced fully enclosed toe space, 3" deep x 5" high. Whenever toe space base is omitted for units to set on building bases on separate steel bases, then the toe space rail shall extend back 4-1/2".
- g. Back construction shall consist of a top and bottom rail, channel formed for maximum strength and welded to back and top flange of end uprights, open for access to plumbing lines. Cupboard units only shall be provided with removable back panels.
- h. Die formed gussets, with multiple ends for strength, shall be furnished in each bottom corner of base units to insure rigidity, and a 3/8"-16 leveling bolt, 3" long, shall engage a clinch nut in each gusset. Access to the leveling bolts shall be through plug buttons in the bottom pan. Each leveling bolt and gusset shall be capable of supporting 500 lbs. Access to leveling bolts through toe space or leveling bolts requiring special tools to adjust are not acceptable.
- i. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear; formed down 3/4" at each end, shelves over 42" long shall be further reinforced with a channel formation welded to underside of shelf.
- j. Drawer bodies shall be made in one-piece construction including the bottom, two sides, back and front. They shall be fully coved at interior bottom on all four sides for easy cleaning. The top front of the inner drawer body shall be offset to interlock with the channel formation in drawer head providing a 3/4" thick drawer head.

- k. Drawer suspension assembly shall consist of 2 sections providing a quiet, smooth operation on ball bearing nylon rollers. All drawers shall be self-closing from a point 5" open. Cabinet channels shall maintain alignment of drawer and provide an integral drawer stop, but the drawer shall be removable without the use of tools. Drawers shall provide 13-5/8" front to back clearance when fully extended. Drawers shall rise when opened thus avoiding friction with lower drawers and/or doors. Drawer suspension system shall incorporate a double stop, lock open feature. Case suspension channels shall be Galvanized Steel, drawer suspension channels shall be Cold Rolled Steel. Drawer suspension channels on Stainless Steel Cabinets shall be zinc plated after they are formed.
- l. Steel Door assembly (two-piece) for solid pan swinging doors shall consist of an inner and outer door pan. Outer door pan shall be formed at all four sides. The corners on the pull side of the outer door pan shall be welded and ground smooth to prevent exposure of sharp edges of steel at these critical points. Inner door pan shall be flanged at all four sides with hinge reinforcements welded in place. The door assembly shall be 3/4" thick and contains sound deadening material.
- m. Steel Drawer/door assemblies shall be painted prior to assembly. Both shall be punched for attaching drawer pulls. Likewise, inner pan formation of door and drawer body shall be indented for in-field installation of locks when required.
- n. Doors shall be readily removable and hinges easily replaceable. Hinges shall be applied to the cabinet and door with screws. Welding of hinges to either cabinet or door will not be acceptable.
- o. Knee space panels, where shown or specified, shall be 18 gauge, finished same as casework cabinets, and easily removable for access to mechanical service areas.

B. Special Purpose Storage Cabinets:

- 1. Acid Storage Fume Hood Cabinets:
Acid storage fume hood cabinets shall utilize the same gauges of steel and construction features as other base cabinets except they shall be completely lined with a one piece Polyethylene corrosion resistant liner. The liner shall be 1/4" thick, molded into a seamless tub, including top, sides and bottom, with a 1" lip at the bottom front to contain spills. Each door shall have a set of louvers at the top and bottom, and have a 1/8" sheet polyethylene liner. Where specified, each cabinet shall be vented into the fume hood with a 1-1/2" vent pipe. It should provide a positive airflow directly into the fume hood exhaust system. Where specified or shown on drawings, supply an epoxy coated wire shelf supported by integral brackets built into the Polyethylene liner.
- 2. Solvent Storage Cabinets:
Solvent storage cabinets shall be specifically designed for the storage of flammable and combustible liquids. Construction shall be based upon the requirements listed by UFC, OSHA and NFPA No. 30 - 1993, and cabinets shall be UL approved and labeled. The bottoms,

top, sides and doors shall be fabricated of 18" gauge steel and shall be all double panel construction with a 1-1/2" air space between panels. All joints shall be welded, or screwed, to provide a rigid enclosure. The doors shall swing on full-length stainless steel piano hinges and shall be fully insulated. The doors are self-closing and synchronized so that both doors will always fully close. The right hand door is equipped with a three-point latching system that automatically engages when the doors close. Each door is equipped with a fusible-link hold-open feature that will ensure the door closes should the temperature outside the cabinet exceed 165 degrees Fahrenheit. Units 24" long have only one door, self-closing, and equipped with a three-point latching system and hold-open feature. A 2" deep liquid tight pan that covers the entire bottom of the cabinet shall be furnished to contain liquid leaks and spills. A full-depth adjustable shelf is also provided. The shelf is perforated to allow air circulation within the cabinet. Two diametrically opposed vents with spark screens are provided in the back of the cabinet as well as a grounding screw. The cabinet shall have interior finish same as exterior. The cabinet shall be labeled: "FLAMMABLE - KEEP FIRE AWAY".

C. Steel Sliding Door Upper Cabinet Construction:

1. Sliding door storage cabinets shall have a completely finished interior same as exterior. Doors shall be suspended from the top by nylon rollers in a roll formed steel track welded to top of cabinet. Track shall be so designed to prevent accidental removal of doors in operation position.
2. End uprights shall be formed at front, bottom and back to provide maximum strength and rigidity. Front fascia of upright shall be 1" wide with inside edge formed in channel 2" x 1/4". A full height box reinforcement shall be fitted to the channel, formed to provide a recessed strike for door and to reinforce the case. The backside of the reinforcement shall be perforated with shelf adjustment holes spaced at not more than 1" centers. The back of upright shall be formed to a 2-1/2" formation. A 14-gauge hinge reinforcement same as specified for base units shall be welded to inner side of front uprights.
3. Cabinet tops shall be formed with a 1-1/2" wide front fascia, and a 2" x 2" channel formation at front edge flanged down and back. Door suspension roll formed steel track shall be welded to cabinet top.
4. Cabinet flush bottoms shall be formed with a 1" wide front fascia, and a channel formation at front edge flanged back and up to create a door recess rabbet for dust stop.
5. Cabinet backs shall be welded to the top, bottom and ends. Backs shall be perforated for shelf adjustment holes on not more than 1" centers. Holes shall be set in a channel formation in cabinet back and enclosed by end uprights.
6. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear, formed down 3/4" at each end, shelves over 42" long shall be further reinforced with a channel formation welded to underside of shelf.
7. Glazed sliding doors shall be suspended from the top in a roll formed steel track welded to cabinet top and shall glide on nylon rollers.

Track shall be so designed to prevent accidental removal of doors. Doors shall be 3/4" thick and consist of an inner and outer door pan welded together to form a single unit. Outer door pan shall be 18 gauge steel, formed into a channel or flanged shape at all four sides. It shall be pierced and formed to create a 3" wide frame with a beveled edge around the glass opening in the center of the door. Inner door pan shall be 18 gauge steel, flanged at all four sides, and pierced for a glass opening in center of the door. Doors shall be glazed with 1/8" float glass, held in place by a rubber or vinyl gasket around the entire edge of the glass. Outer door pan shall be pierced for a recessed flush pull, as described under HARDWARE.

8. Solid panel sliding doors shall be suspended same as glazed sliding doors. Door assembly (two-piece) shall consist of inner and outer pan formations, mechanically assembled after painting. All doors shall be 3/4" thick and contains sound deadening material.
9. Sliding plate glass doors shall be available for 48" high cases and under. The plate glass doors shall operate on an extruded aluminum track at the bottom of the cabinet, and in an extruded aluminum channel at the top. The bottom of each glass door shall be furnished with a continuous aluminum shoe the full length of the door, which shall be equipped with two nylon rollers that operate on the extruded aluminum track. The aluminum shoes on the bottom of the plate glass doors shall be equipped with pulls for operation of the doors, and also to prevent bypassing of the doors. Plate glass doors shall close against rubber bumpers.

D. Steel Swinging Door Upper Cabinet Construction:

1. Swinging door storage cabinets shall have a completely finished interior same as exterior.
2. End uprights shall be formed at the front in a 1" channel formation with the inside flange formed to provide a 31/32" x 1/2" door recess. The back of the upright shall be formed to a 2-1/2" formation. A 14 gauge hinge reinforcement, same as specified for BASE CABINETS, shall be welded to inner side of front uprights.
3. Cabinet tops shall be formed into a 1" x 1-3/16" channel shape at front, with a 31/32" x 1/2" offset for door recess, and with flange at rear and sides for electro-welding cabinet top to cabinet back and ends.
4. Cabinet flush bottoms shall be formed with a 1" wide front fascia and a 13/16" channel shape formation at front edge flanged back and up to create a door recess rabbet for dust stop.
5. Cabinet backs shall be welded to the top, bottom and ends. Backs shall be perforated for shelf adjustment holes on not more than 1" centers. Holes shall be set in a channel formation in cabinet back and enclosed by end uprights.
6. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear, formed down 3/4" at each end, shelves over 42" long shall be further reinforced with a channel formation welded to underside of shelf.
7. Glazed swinging doors shall be 3/4" thick and consist of an inner and

outer door pan welded to form a single unit. Outer door pan shall be 18 gauge steel, formed into a channel or flanged shape at all four sides. It shall be pierced and formed to create a 3" wide frame with a beveled edge around the glass opening in the center of the door. Inner door pan shall be 18 gauge steel, flanged at all four sides, pierced for a glass opening in center of the door, with 14 gauge hinge reinforcements welded in place. Doors shall be glazed with 1/8" float glass, held in place by a rubber or vinyl gasket around the entire edge of the glass. Outer door pan shall be pierced for a recessed flush pull, as described under HARDWARE.

8. Door assembly (two-piece) for solid panel swinging doors shall consist of an inner and outer door pan. Outer door pan shall be formed into a channel or flanged shape at all four sides. The corners on the pull side of the outer door pan shall be welded and ground smooth to prevent exposure of sharp edges of steel at these critical points. Inner door pan shall be flanged at all four sides with hinge reinforcements welded in place. The door assembly shall be 3/4" thick and contains sound deadening material.

E. Steel Sliding Door Full Height Cabinet Construction:

1. Sliding door full height storage cabinets shall have a completely finished interior same as exterior. Doors shall be suspended from the top by nylon rollers in a roll formed steel track welded to top of cabinet. Track shall be so designed to prevent accidental removal of doors in operating position.
2. End uprights shall be formed at front, bottom and back to provide maximum strength and rigidity. Front fascia of upright shall be 1-1/4" wide with inside edge formed in a channel 1/2" x 3/8". A full height box reinforcement shall be fitted to the channel, formed to provide a recessed strike for door and to reinforce the cabinet. The backside of the reinforcement shall be perforated with shelf adjustment holes spaced at not more than 1" centers. Back of upright shall be formed in a 2-1/2" formation. 14 gauge hinge reinforcement same as specified for base cabinets shall be welded to inner side of front uprights.
3. Cabinet tops shall be formed in a channel shape at front with a 13/16" wide, front fascia, and a 31/32" x 1/2" channel formation at bottom and back edge flanged down. Front fascia channel shall be strengthened with electro-weld reinforcements. Door suspension system shall be mechanically fastened to reinforcement.
4. Cabinet bottoms for storage cabinets shall be formed down on sides and back to create a square edge transition welded to cabinet end panels, and front edge shall be offset to create a seamless drawer and door recess rabbet for dust stop. Cabinet bottoms shall be formed to provide a flush 1" face rail with a return flange to give a 9/16" deep x 5" high toe space. All cabinets shall have a cleanable smooth interior. Bottom edges shall.
5. Toe space rails shall interlock in back of bottom rail and with end panel to provide a welding plate, and shall extend to the floor with a formed as support flange.
6. Cabinet backs shall be welded to the top, bottom and ends. Backs shall be perforated for shelf adjustment holes on not more than 1"

centers. Holes shall be enclosed by a formation in cabinet back and enclosed by end uprights.

7. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear; formed down 3/4" at each end, shelves over 42" long shall be further reinforced with a channel formation electro-welded to underside of shelf.
8. Glazed sliding doors shall be suspended from the top in a roll formed steel track welded to cabinet top and shall glide on nylon rollers. Track shall be so designed to prevent accidental removal of doors. Doors shall be 3/4" thick and consist of an inner and outer door pan welded together to form a single unit. Outer door pan shall be 18 gauge steel, formed into a channel or flanged shape at all four sides. It shall be pierced and formed to create a 3" wide frame with a beveled edge around the glass opening in the center of the door. Inner door pan shall be 18 gauge steel, flanged at all four sides, and pierced for a glass opening in center of the door. Doors shall be glazed with 1/8" float glass, held in place by a rubber or vinyl gasket around the entire edge of the glass. Outer door pan shall be pierced for a recessed flush pull, as described under HARDWARE.
9. Solid panel sliding doors shall be suspended same as glazed sliding doors. Door assembly (two-piece) shall consist of inner and outer pan formations mechanically assembled after painting. All full height solid panel doors shall be further reinforced by a full-height channel formation welded to inner pan. Doors shall be 3/4" thick and contains sound deadening material.

F. Steel Swinging Door Full Height Cabinet Construction:

1. Swinging door full height storage cabinets shall have a completely finished interior same as exterior.
2. End uprights shall be formed at the front in a 1" channel formation with the inside flange formed to provide a 31/32" x 1/2" door recess. The back of the upright shall be formed to a 2-1/2" formation. A 14 gauge hinge reinforcement, same as specified for BASE CABINETS, shall be welded to inner side of front uprights.
3. Cabinet tops shall be formed into a 1" x 1-3/16" channel shape at front, with a 31/32" x 1/2" offset for door recess, and with flange at rear and sides for electro-welding cabinet top to cabinet back and ends.
4. Cabinet bottoms for storage cabinets shall be formed down on sides and back to create a square edge transition welded to cabinet end panels, and front edge shall be offset to create a seamless drawer and door recess rabbet for dust stop. Cabinet bottoms shall be formed to provide a flush 1" face rail with a return flange to give a 9/16" deep x 5" high toe space.
5. Cabinet backs shall be welded to the top, bottom and ends. Backs shall be perforated for shelf adjustment holes on not more than 1" centers. Holes shall be set in a channel formation in cabinet back and enclosed by end uprights.
6. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear, formed down 3/4" at

each end, shelves over 42" long shall be further reinforced with a channel formation welded to underside of shelf.

7. Toe space rails shall interlock in back of bottom rail and with end panel to provide a welding plate, and shall extend to the floor with a flange turned back 1-1/2" and turned up 3/8" for support.
8. Glazed swinging doors shall be 3/4" thick and consist of an inner and outer door pan welded to form a single unit. Outer door pan shall be 18 gauge steel, formed into a channel or flanged shape at all four sides. It shall be pierced and formed to create a 3" wide frame with a beveled edge around the glass opening in the center of the door. Inner door pan shall be 18 gauge steel, flanged at all four sides, pierced for a glass opening in center of the door, with a 14 gauge hinge reinforcements welded in place. Doors shall be glazed with 1/8" float glass, held in place by a rubber or vinyl gasket around the entire edge of the glass. Outer door pan shall be pierced for a recessed flush pull, as described under HARDWARE.
9. Solid panel swinging doors (two-piece) shall consist of an inner and outer pan formation, mechanically assembled after painting. All exterior surfaces shall be welded and ground smooth. Inner door pan shall be flanged for mechanical assembly. Door shall have a 14 gauge hinge reinforcement welded at hinge slot; as well as a full-height channel formation welded to inner pan. Doors shall be 3/4" thick and contains sound deadening material.

G. Steel Free Standing Table Construction:

1. In general, freestanding tables and/or apron and leg assemblies consist of welded leg assemblies connected to aprons by mechanical fasteners.
2. Table apron rails shall be formed of 16-gauge steel. The rails shall be 4" high, formed top and bottom into a 1.844" wide channel formation with 3/8" high return. Where drawers occur, the apron rails shall provide the required opening.
3. Table legs shall be 2" square welded tubing. Securely welded to bottom end shall be a 14-gauge die formed gusset with four flanges. A threaded clinch nut shall accommodate a 3/8" 16 x 2-1/2" long adjustment bolt.
4. Stretchers shall be constructed of 18-gauge steel and furnished where indicated on drawings. They shall be formed into a 2-7/64" x 1-1/2" channel formation, and secured to table legs by a die-formed clip of 16-gauge steel. Clips shall be welded at ends of channel.
5. Table tops shall be as indicated on drawing and by specifications, and all clips, screws and parts for fastening top to apron, shall be provided with apron section. Leg shoes for table legs shall be furnished with leg assembly.

2.05 PERFORMANCE REQUIREMENTS

A. Steel Casework Construction Performance:

1. Base cabinets shall be constructed to support at least a uniformly

distributed load 200 lbs. per square foot of cabinet top area, including working surface without objectionable distortion of interference with door and drawer operation.

2. Base cabinet corner gussets with leveling bolts shall support 500 lbs. per corner, at 1-1/2" projection of the leveling bolt below the gusset.
3. Each adjustable and fixed shelf 4 ft. or shorter in length shall support an evenly distributed load of 40 lbs. per square ft. up to a maximum of 200 lbs., with nominal temporary deflection, but without permanent set.
4. Drawer construction and performance shall allow 13-5/8" clear when in an extended position and suspension system shall prevent friction contact with any other drawer or door during opening or closing. All drawers shall operate smoothly, a minimum of 10,000 cycles with an evenly distributed load of 150 lbs.
5. Swinging doors on floor-mounted casework shall support 200 lbs. suspended at a point 12" from hinged side, with door swung through an arc of 160 degrees. Weight load test shall allow only a temporary deflection, without permanent distortion or twist. Door shall operate freely after test and assume a flat plane in a closed position.

B. Steel Paint System Finish and Performance Specification:

1. Steel Paint System Finish:
After Cold Rolled Steel component parts have been completely welded together and before finishing, they shall be given a pre-paint treatment to provide excellent adhesion of the finish system to the steel and to aid in the prevention of corrosion. Physical and chemical cleaning of the steel shall be accomplished by washing with an alkaline cleaner, followed by a spray treatment with a complex metallic phosphate solution to provide a uniform fine grained crystalline phosphate surface that shall provide both an excellent bond for the finish and enhance the protection provided by the finish against humidity and corrosive chemicals.

After the phosphate treatment, the steel shall be dried and all steel surfaces shall be coated with a chemical and corrosion-resistant, environmentally friendly, electrostatically applied powder coat finish. All components shall be individually painted, insuring that no area be vulnerable to corrosion due to lack of paint coverage. The coating shall then be cured by baking at elevated temperatures to provide maximum properties of corrosion and wear resistance.

The completed finish system in standard colors shall meet the performance test requirements specified under PERFORMANCE TEST RESULTS.

2. Performance Test Results (Chemical Spot Tests):

- a. Testing Procedure:
Chemical spot tests for non-volatile chemicals shall be made by applying 5 drops of each reagent to the surface to be tested and covering with a 1-1/4" dia. watch glass, convex side down to confine the reagent. Spot tests of volatile chemicals shall be tested by placing a cotton ball saturated with reagent on the surface to be tested and covering with an inverted 2-ounce wide

mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire test period, and at a temperature of $77^{\circ} \pm 3^{\circ}$ F. For both methods, leave the reagents on the panel for a period of one hour. At the end of the test period, the reagents shall be flushed from the surface with water, and the surface scrubbed with a soft bristle brush under running water, rinsed and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Immediately prior to evaluation, 16 to 24 hours after the reagents are removed, the test surface shall be scrubbed with a damp paper towel and dried with paper towels.

b. Test Evaluation:

Evaluation shall be based on the following rating system.

Level 0- No detectable change.

Level 1- Slight change in color or gloss.

Level 2- Slight surface etching or severe staining.

Level 3- Pitting, cratering, swelling, or erosion of coating.
 Obvious and significant deterioration.

After testing, panel shall show no more than three (3) Level 3 conditions.

c. Test Reagents

Test No.	Chemical Reagent	Test Method
1.	Acetate, Amyl	Cotton ball & bottle
2.	Acetate, Ethyl	Cotton ball & bottle
3.	Acetic Acid, 98%	Watch glass
4.	Acetone	Cotton ball & bottle
5.	Acid Dichromate, 5%	Watch glass
6.	Alcohol, Butyl	Cotton ball & bottle
7.	Alcohol, Ethyl	Cotton ball & bottle
8.	Alcohol, Methyl	Cotton ball & bottle
9.	Ammonium Hydroxide, 28%	Watch glass
10.	Benzene	Cotton ball & bottle
11.	Carbon Tetrachloride	Cotton ball & bottle
12.	Chloroform	Cotton ball & bottle
13.	Chromic Acid, 60%	Watch glass
14.	Cresol	Cotton ball & bottle
15.	Dichlor Acetic Acid	Cotton ball & bottle
16.	Dimethylformamide	Cotton ball & bottle
17.	Dioxane	Cotton ball & bottle
18.	Ethyl Ether	Cotton ball & bottle
19.	Formaldehyde, 37%	Cotton ball & bottle
20.	Formic Acid, 90%	Watch glass
21.	Furfural	Cotton ball & bottle
22.	Gasoline	Cotton ball & bottle
23.	Hydrochloric Acid, 37%	Watch glass
24.	Hydrofluoric Acid, 48%	Watch glass
25.	Hydrogen Peroxide, 3%	Watch glass
26.	Iodine, Tincture of	Watch glass
27.	Methyl Ethyl Ketone	Cotton ball & bottle
28.	Methylene Chloride	Cotton ball & bottle
29.	Mono Chlorobenzene	Cotton ball & bottle
30.	Naphthalene	Cotton ball & bottle
31.	Nitric Acid, 20%	Watch glass

32.	Nitric Acid, 30%	Watch glass
33.	Nitric Acid, 70%	Watch glass
34.	Phenol, 90%	Cotton ball & bottle
35.	Phosphoric Acid, 85%	Watch glass
36.	Silver Nitrate, Saturated	Watch glass
37.	Sodium Hydroxide, 10%	Watch glass
38.	Sodium Hydroxide, 20%	Watch glass
39.	Sodium Hydroxide, 40%	Watch glass
40.	Sodium Hydroxide, Flake	Watch glass
41.	Sodium Sulfide, Saturated	Watch glass
42.	Sulfuric Acid, 33%	Watch glass
43.	Sulfuric Acid, 77%	Watch glass
44.	Sulfuric Acid, 96%	Watch glass
45.	Sulfuric Acid, 77% and Nitric Acid, 70%, equal parts	Watch glass
46.	Toluene	Cotton ball & bottle
47.	Trichloroethylene	Cotton ball & bottle
48.	Xylene	Cotton ball & bottle
49.	Zinc Chloride, Saturated	Watch glass

* Where concentrations are indicated, percentages are by

weight.

3. Performance Test Results (Heat Resistance):
 Hot water (190° F - 205° F) shall be allowed to trickle (with a steady stream at a rate not less than 6 ounces per minute) on the finished surface, which shall be set at an angle of 45° from horizontal, for a period of five minutes. After cooling and wiping dry, the finish shall show no visible effect from the hot water treatment.
4. Performance Test Results (Impact Resistance):
 A one-pound ball (approximately 2" diameter) shall be dropped from a distance of 12 inches onto the finished surface of steel panel supported underneath by a solid surface. There shall be no evidence of cracks or checks in the finish due to impact upon close eye-ball examination.
5. Performance Test Results (Bending Test):
 An 18 gauge steel strip, finished as specified, when bent 180° over a 1/2" diameter mandrel, shall show no peeling or flaking off of the finish.
6. Performance Test Results (Adhesion):
 Ninety or more squares of the test sample shall remain coated after the scratch adhesion test. Two sets of eleven parallel lines 1/16" apart shall be cut with a razor blade to intersect at right angle thus forming a grid of 100 squares. The cuts shall be made just deep enough to go through the coating, but not into the substrate. They shall then be brushed lightly with a soft brush. Examine under 100 foot-candles of illumination. Note: This test is based on ASTM D2197-68, "Standard Method of Test for Adhesion of Organic Coatings".
7. Performance Test Results (Hardness):
 The test sample shall have a hardness of 4-H using the pencil hardness test. Pencils, regardless of their brand are valued in this way: 8-H is the hardest, and next in order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which is the softest).

The pencils shall be sharpened on emery paper to a wide sharp edge. Pencils of increasing hardness shall be pushed across the paint film in a chisel-like manner until one is found that will cut or scratch the film. The pencil used before that one-that is, the hardest pencil that will not rupture the film-is then used to express or designate the hardness.

2.06 WORKSURFACES

A. MATERIALS

1. Epoxy Resin Tops:

Epoxy Resin tops shall consist of modified epoxy resin that has been especially compounded and cured to provide the optimum physical and chemical resistance properties required of a heavy-duty laboratory table top. Tops and curbs shall be a uniform mixture throughout their full thickness, and shall not depend upon a surface coating that is readily removed by chemical and/or physical abuse. Tops and curbs shall be non-glaring. Tops shall be 1" thick, exposed edges beveled top and bottom, and drip grooves provided on the underside at all exposed edges. 4" high curbs at the backs and ends of tops shall be 1" thick and bonded to the deck to form a square watertight joint. Sink cutouts shall be smooth and uniform without saw marks with the top edge beveled. The bottom edge of the sink opening shall be finished smooth with the edge broken to prevent sharpness. Corners of sink cutouts shall be radiused not less than 3/4"

2. Plastic Laminate Tops:

Plastic laminate tops and back-splash shall be built up to a 1/16" thick plastic surface (of the color and pattern selected), attached to the sub-top with a water resistant adhesive. Substrate shall be of 40-45 lbs. medium density particle board to make a finished top thickness of 1". All exposed edges shall be self-edge banded unless otherwise specified. All particle board edges and underside of top shall be sealed.

B. WORK TOP PERFORMANCE REQUIREMENTS:

1. Molded Epoxy Resin:

a. Physical Properties:

Flexural Strength (A.S.T.M. Method D790-90) =
15,000 PSI

Compressive Strength (A.S.T.M. Method D695-90) =
30,000 PSI

Hardness, Rockwell E (A.S.T.M. Method D785-89) =
100

Water Absorption (A.S.T.M. Method D570-81)% by weight, 24 Hours =
0.04

% by weight, 7 Days =

0.05

% by weight, 2 Hour Boil =

0.04

Specific Gravity =

1.97

Tensile Strength =

8,500 PSI

b. Performance Test Results (Heat Resistance):

A high form porcelain crucible, size 0, 15 ml capacity, shall be heated over a Bunsen burner until the crucible bottom attains an incipient red heat. Immediately, the hot crucible shall be transferred to the top surface and allowed to cool to room temperature. Upon removal of the cooled crucible, there shall be no blisters, cracks or any breakdown of the top surface whatsoever.

c. Performance Test Results (Chemical Resistance):

Tops shall resist chemical attacks from normally used laboratory reagents. Weight change of top samples submerged in the reagents* listed in the next paragraph for a period of seven (7) days shall be less than one-tenth of one percent, except that the weight change for those reagents marked with ** shall be less than one percent. (Tests shall be performed in accordance with A.S.T.M. Method D543-67 at 77o F.).

*Where concentrations are indicated, percentages are by weight.

Acetic Acid, Glacial	Iso-Octane
Acetic Acid, 5%	Kerosene
Acetone	Methyl Alcohol
Ammonium Hydroxide, 28%	Mineral Oil
Ammonium Hydroxide, 10%	Methyl Ethyl Ketone
Aniline Oil	Nitric Acid, 70%**
Benzene	Nitric Acid, 40%
Carbon Tetrachloride	Nitric Acid, 10%
Chromic Acid, 40%**	Oleic Acid
Citric Acid, 10%	Olive Oil
Cottonseed Oil	Phenol, 5%
Dichromate Cleaning Solution**	Soap Solution, 1%
Diethyl Ether	Sodium Carbonate, 20%
Dimethyl Formamide	Sodium Carbonate, 2%
Distilled Water	Sodium Chloride, 10%
Detergent Solution, 1/4%	Sodium Hydroxide, 50%
Ethyl Acetate	Sodium Hydroxide, 10%
Ethyl Alcohol, 95%	Sodium Hydroxide, 1%
Ethyl Alcohol, 50%	Sodium Hypochlorite, 5%
Ethylene Dichloride	Sulfuric Acid, 85%
Heptane	Sulfuric Acid, 30%
Hydrochloric Acid, 37%	Sulfuric Acid, 3%
Hydrochloric Acid, 10%	Toluene
Hydrogen Peroxide, 28%	Transformer Oil
Hydrogen Peroxide, 3%	Turpentine

NOTE: Dichromate cleaning solution is a formula from Lange's Handbook of Chemistry.

d. Performance Test Results (Chemical Spot Tests - 24 Hours):

Chemical spot tests shall be made by applying 10 drops (approximately 1/2 cc) of each reagent to the surface to be tested. Each reagent (except those marked **) shall be covered with a 1-1/2" diameter watch glass, convex side down to confine the reagent. Spot tests of volatile solvents marked ** shall be tested as follows: A 1" or larger ball of cotton shall be saturated with the solvent and placed on the surfaces to be tested. The cotton ball shall then be covered by an inverted 2-ounce, wide mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire 24-hour test period and at a temperature

of 77 degrees F. + 3 degrees F. At the end of the test period, the reagents shall be flushed from the surfaces with water and the surface scrubbed with a soft bristle brush under running water, rinsed, and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Spots where dyes have dried shall be cleaned with a cotton swab soaked in alcohol to remove the surface dye. The test panel shall then be evaluated immediately after drying.

Ratings:

A = No effect or slight change in gloss.
 B = Slight change in color or marked loss of gloss
 C = Slight surface etching or severe staining.
 D = Swelling, pitting, or severe etching.

Reagents*	Rating
Acetic Acid, 98%	A
Acetone**	A
Ammonium Hydroxide, 28%	A
Carbon Tetrachloride**	A
Chloroform**	A
Chromic Acid, 60%	C
Chromic Acid, 40%	C
Dichromate Cleaning Solution***	C
Dimethyl Formamide	A
Ethyl Acetate**	A
Ethyl Alcohol**	A
Formaldehyde, 37%	A
Formic Acid, 90%	A
Hydrochloric Acid, 37%	A
Hydrofluoric Acid, 48%	C
Hydrogen Peroxide, 28%	A
Methanol**	A
Methylethyl Ketone**	A
Nitric Acid, 70%	B
Phenol, 85%	A
Phosphoric Acid, 85%	A
Sodium Carbonate, 20%	A
Sodium Hydroxide, 40%	A
Sodium Hydroxide, 10%	A
Sodium Hypochlorite, 5%	A
Sulfuric Acid, 96%	D
Sulfuric Acid, 85%	A
Toluene**	A
Wrights Blood Stain	A
Xylene**	A

* Where concentrations are indicated, percentages are by weight.

** Indicates these solvents tested with cotton and jar method.

*** Dichromate cleaning solution is a formula from Lange's Handbook of Chemistry.

2.07 SINKS AND DRAINS TROUGHS

A. SINKS:

1. Molded Epoxy Resin Sinks:

MANUFACTURED METAL CASEWORK

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Sinks shall be molded of modified epoxy resin, carefully compounded with selected materials to provide maximum physical and chemical properties. Sinks shall be non-glaring with all inside corners coved and the bottom pitched to the drain outlet. Sinks shall possess a high resistance to mechanical and thermal shock.

Stainless Steel Sinks:

Stainless steel sinks shall be Type 304 stainless steel, except in photographic developing sinks where Type 316 stainless steel shall be used. All exposed surfaces shall be finished in a No. 4 finish. Sinks shall be 18 gauge metal unless heavier gauges are specified or dictated by construction requirements. All sink joints shall be continuously welded by the heliarc welding process. Inside radii shall be 1-1/8". Bottoms shall be pitched to the drain indent. Sink bowl shall be so welded to the top as to form an integral part thereof where sinks are built into stainless steel tops or working surfaces. Top edges of free standing sinks shall be formed into a channel formation with all joints welded and ground smooth and polished. No soldering will be permitted in connection with sink construction. Stainless steel sinks shall be furnished with crumb cup strainers unless otherwise specified.

- A. Sinks: (Choose one or more and import information from SINKS, CUPSINKS, and DRAIN spec.)
 - 1. Molded Epoxy Resin Sinks
 - 2. Stainless Steel Sinks
- B. Cupsinks: (Choose one or more and import information from SINKS, CUPSINKS, and DRAIN spec.)
 - 1. Molded Epoxy Resin
 - 2. Stainless Steel
- C. Drain Troughs: (Import information from SINKS, CUPSINKS, and DRAIN spec.)

2.08 FITTINGS

- A. Materials: (Choose one or more and import information from SERVICE FITTINGS AND ACCESSORIES spec.)
 - 1. Chrome-plated red brass or bronze
 - 2. Coated red brass or sepia bronze
- B. Construction: (Choose one or more and import information from SERVICE FITTINGS AND ACCESSORIES spec.)
 - 1. Valves:
 - a. Front-loaded valves
 - 1) Water
 - 2) Steam
 - 3) Distilled Water
 - 4) Ground key dry service
 - 5) Needle valve dry service
 - b. Rod-driven remote control valves
 - 1) Water
 - 2) Steam
 - 3) Distilled Water

- 4) Needle valve dry service
- 2. Outlets
 - a. Goosenecks
 - b. Aerator outlets
 - c. Tank nipples
 - d. Sink outlets
- 3. Electrical Fittings
- 4. Miscellaneous
 - a. Crumb cup strainers
 - b. Vacuum breakers
- C. Performance: (Choose one or more and import information from SERVICE FITTINGS AND ACCESSORIES spec.)
 - 1. Maximum line pressures
 - a. Laboratory ball valves
 - b. Needle point cocks
 - c. Vacuum valve
 - d. Water (H&C) valve
 - e. Steam valve
 - 2. Sepia bronze finish performance

PART 3 - EXECUTION

3.00 SITE EXAMINATION

- A. The owner and/or his representative shall assure all building conditions conducive to the installation of a finished goods product; all critical dimensions and conditions previously checked have been adhered to by other contractors (general, mechanical, electrical, etc.) to assure a quality installation.

3.01 INSTALLATION

- A. Preparation:
Prior to beginning installation of casework, check and verify that no irregularities exist that would affect quality of execution of work specified.
- B. Coordination:
Coordinate the work of the Section with the schedule and other requirements of other work being prepared in the area at the same time both with regard to mechanical and electrical connections to and in the fume hoods and the general construction work.
- C. Performance:
 - 1. Casework:
 - a. Set casework components plumb, square, and straight with no distortion and securely anchor to building structure. Shim as required using concealed shims.
 - b. Bolt continuous cabinets together with joints flush, tight and uniform, and with alignment of adjacent units within 1/16"

tolerance.

- c. Secure wall cabinets to solid supporting material, not to plaster, lath or gypsum board.
- d. Abut top edge surfaces in one true plane. Provide flush joints not to exceed 1/8".

2. Worksurfaces:

- a. Where required due to field conditions, scribe to abutting surfaces.
- b. Only factory prepared field joints, located per approved shop drawings, shall be permitted. Secure the joints in the field, where practical, in the same manner as in the factory.
- c. Secure worksurfaces to casework and equipment components with materials and procedures recommended by the manufacturer.

D. Adjust and Clean:

1. Repair or remove and replace defective work, as directed by owner and/or his representative upon completion of installation.
2. Adjust doors, drawers and other moving or operating parts to function smoothly.
3. Clean shop finished casework; touch up as required.
4. Clean worksurfaces and leave them free of all grease and streaks.
5. Casework to be left broom clean and orderly.

E. Protection:

1. Provide reasonable protective measures to prevent casework and equipment from being exposed to other construction activity.
2. Advise owner and/or his representative of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.

- - - E N D - - -

SECTION 12 34 00
MANUFACTURED PLASTIC CASEWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Fixed modular laminate clad casework and components.
- B. Countertops.
- C. Mobile storage units, tables and components.

1.02 RELATED SECTIONS

- A. Blocking within walls where indicated: Division 6.
- B. Millwork, trim, and custom cabinetry: Division 6.
- C. Locks master keyed to room doors: Division 8.
- D. Glass: Division 8.
- E. Base molding: Division 9.
- F. Appliances: Division 11.
- G. Sinks and service fixtures, service waste lines, connections, and vents: Division 15.
- H. Electrical service fixtures: Division 16.

1.03 DEFINITIONS

- A. Identification of casework components and related products by surface visibility.
 - 1. Open Interiors: Any open storage unit without solid door or drawer fronts, units with full glass insert doors and/or acrylic doors, and units with sliding solid doors.
 - 2. Closed Interiors: Any closed storage unit behind solid door or drawer fronts.
 - 3. Exposed Ends: Any storage unit exterior side surface that is visible after installation.
 - 4. Other Exposed Surfaces: Faces of doors and drawers when closed, and tops of cabinets less than 72 inches above furnished floor.
 - 5. Semi-Exposed Surfaces: Interior surfaces which are visible, bottoms of wall cabinets and tops of cabinets 72 inches or more above finished floor.
 - 6. Concealed Surfaces: Any surface not visible after installation.

1.04 QUALITY ASSURANCE

- A. Manufacturer: Minimum of 5 years experience in providing manufactured casework systems for similar types of projects, produce evidence of financial stability, bonding capacity, and adequate facilities and personnel required to perform on this project.
- B. Manufacturer: Provide products certified as meeting or exceeding ANSI-A 161.1-2000 testing standards.
- C. Quality Standard: Unless otherwise indicated, comply with AWI's Architectural Woodwork Quality Standards for grades of interior architectural woodwork, construction, finishes and other requirements.

1.05 SUBMITTALS

- A. Comply with Section 01330, unless otherwise indicated.
- B. Product Data: Manufacturer's catalog with specifications and construction details.
- C. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.

1. Include section drawings of typical and special casework, work surfaces and accessories.
 2. Indicate locations of plumbing and electrical service field connection by others.
- D. Casework Samples:
1. Base cabinet: Cabinet conforming to specifications, with drawer and door.
 2. Wall cabinet: Cabinet conforming to specifications, with door.
 3. Cabinet samples shall be complete with specified hardware for doors, drawers and shelves.
 4. Component samples: Two sets of samples for each of the following:
 - a. Decorative laminate color charts / PVC edgings.

1.06 PRODUCT HANDLING

- A. Deliver completed laminate casework, countertops, and related products only after wet operations in building are completed, store in ventilated place, protected from the weather, with relative humidity range of 25 percent to 55 percent.
- B. Protect finished surfaces from soiling and damage during handling and installation with a protective covering.

1.07 JOB CONDITIONS

- A. Environmental Requirements: Do not install casework until permanent HVAC systems are operating and temperature and humidity have been stabilized for at least 1 week.
1. Manufacturer/Supplier shall advise Contractor of temperature and humidity requirements for architectural casework installation areas.
 2. After installation, control temperature and humidity to maintain relative humidity between 25 percent and 55 percent.
- B. Conditions: Do not install casework until interior concrete work, masonry, plastering and other wet operations are complete.

1.08 WARRANTY

- A. All materials and workmanship covered by this section will carry a five (5) year warranty from date of acceptance.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

- A. Manufacturer:
1. caseworkUSA as manufactured by Wisconsin Bench of Thorp, WI.
 - a. Drawings and specifications are based on manufacturer's literature from Wisconsin Bench of Thorp, WI, fixed modular, and mobile casework and accessories.
 - b. Other manufacturers shall comply with the minimum levels of material and detailing indicated on the drawings or as specified.

2.02 MATERIALS

- A. Core Materials:
1. Particleboard up to 7/8 inch thick: Industrial Grade average 47-pound density particleboard, ANSI A 208.1-1999, M-3.
 2. Particleboard 1 inch thick and thicker: Industrial Grade average 45-pound density particle-board, ANSI A 208.1-1999, M-2.
 3. Medium Density Fiberboard 1/4 inch thick: Average 54-pound density grade, ANSI A208.2.

4. MR Moisture Resistant Particleboard: Average 47-pound density particleboard, ANSI A208.1 1-1999, M-3.
- B. Decorative Laminates: GREENGAURD Indoor Air Quality Certified
 1. High-pressure decorative laminate VGS (.028), NEMA Test LD 3-2005.
 2. High-pressure decorative laminate HGS (.048), NEMA Test LD 3-2005.
 3. High-pressure decorative laminate HGP (.039), NEMA Test LD 3-2005.
 4. High-pressure cabinet liner CLS (.020), NEMA Test LD 3-2005.
 5. High-pressure backer BKH (.048), (.039), (.028), NEMA Test LD3-2005.
 6. Thermally fused melamine laminate, NEMA Test LD 3-2005, color matched with White.
- C. Laminate Color Selection: Maximum 1 color per unit face and 5 colors per project. (See Color Selection in section 3.05).
- D. Edging Materials:
 1. .5mm PVC banding, machine applied.
 2. 3mm PVC banding, machine applied and machine profiled to 1/8 inch radius.
- E. Glass:
 1. Wall unit full sliding glass doors: 1/4 inch thick safety glass.
 2. Glass insert doors, hinged or sliding wall cabinets: 1/4 inch thick safety glass.
 3. Glass insert doors, hinged or sliding tall or base cabinets. 1/4 inch thick safety glass.
 4. Sliding doors mounted in aluminum track.
 5. Trim glass inserts: Extruded rigid PVC

2.03 SPECIALTY ITEMS

- A. Support Members:
 1. Countertop support brackets: Epoxy powder coated, 11 gauge steel with integral cleat mount opening and wire management opening.
 2. Undercounter support frames: Epoxy powder coated.
 3. Legs: Epoxy powder coated.
- B. Mobile Storage Units:
 1. Casters: Ball bearing, heavy gauge steel fork, zinc plate finish with 2 brakes per unit. Load capacity per caster to be a minimum of 200 pounds.
 2. Side panels, back, top, drawer fronts, and doors are of 3/4 inch thick particleboard, laminated on the exterior with high pressure decorative laminate VGS and on the interior with high pressure CLS cabinet liner. Exposed edges are PVC banding, .5mm or 3mm thickness, to match adjacent casework.
 3. Low mobile storage units are mounted to a caster base.
- C. Computer Keyboard Tray:
 1. Non-articulating, undercounter mount with positive stop drawer slides.

2.04 CABINET HARDWARE

- A. Hinges:
 1. Five knuckle, epoxy powder coated or brushed chrome, institutional grade, 2-3/4 inch overlay type with hospital tip. 0.095 inch thick. ANSI-BHMA standard A156.9, Grade 1.
 - a. Doors 48 inches and over in height have 3 hinges per door.

- b. Magnetic door catch with maximum 15 pound pull provided, attached with screws and slotted for adjustment.
- B. Pulls:
 - 1. Door and drawer front pulls are wire pulls, mechanically fastened.
 - 2. Semi-recessed pulls are to be mechanically fastened
- C. Drawer Slides:
 - 1. Cabinet Drawers: 100 - pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop in both directions with self-closing features. File storage drawers, 150 load rated epoxy coated steel slides.
 - 2. Knee space and pencil: 100-pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop both directions with self-closing feature.
Paper storage, 150-pound load rated epoxy coated steel slides.
 - 3. File: Full extension, 150-pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop both directions with self-closing feature.
- D. Adjustable Shelf Supports:
 - 1. Injection molded transparent polycarbonate friction fit into cabinet end panels and vertical dividers, adjustable on 32mm centers. Each shelf support has 2 integral support pins, 5mm diameter, to interface pre-drilled holes, and to prevent accidental rotation of support. The support automatically adapts to 3/4 inch or 1 inch thick shelving and provides non-tip feature for shelving. Supports may be field fixed if desired. Structural load to 1200 pounds (300 pounds per support) without failure.
- E. Locks:
 - 1. Removable core, deadbolt style lock with strike. Lock for sliding 3/4 inch thick doors is a disc type plunger lock, sliding door type with strike. Lock for sliding glass/acrylic doors is a ratchet type sliding showcase lock.
 - 2. Elbow catch or chain bolt used to secure inactive door on all locked cabinets.
- F. Sliding Door Track: Anodized aluminum double channel.
- G. Coat Rods: 1 inch diameter, 14-gauge chrome plated steel installed in captive mounting hardware.
- H. File Suspension System: Extruded molding integral with top of drawer box sides to accept standard hanging file folders.
- I. Mirrors: 1/4 inch thick polished mirror plate.

2.05 FABRICATION:

- A. Fabricate casework, countertops and related products to dimensions, profiles, and details shown.
- B. All casework panel components must go through a supplemental sizing process after cutting, producing a panel precisely finished in size and squareness to within 0.010 inches, ensuring strict dimensional quality and structural integrity in the final fabricated product.
- C. Cabinet Body Construction:
 - 1. Tops and bottoms are glued and doweled to cabinet sides and internal cabinet components such as fixed horizontals, rails and verticals. Minimum 6 dowels each joint for 24 inch deep cabinets and a minimum of 4 dowels each joint for 12 inch deep cabinets.
 - a. Tops, bottoms and sides of all cabinets are particleboard core.

- b. Tops, bottoms and sides of sink base units are moisture resistant particleboard core.
 2. Cabinet backs: 1/2 inch thick particle board panel fully captured by the cabinet top, bottom and side panels. Finish to match cabinet interior. 3/4 inch x 4 inch particleboard rails will be placed behind the back panel at the top and bottom, and doweled to the sides utilizing 10mm hardwood fluted dowels. A third intermediate rail will be included on all cabinets taller than 56 inches. Utilize hot melt glue to further secure back and increase overall strength.
 - a. Exposed back on fixed or movable cabinets: 3/4 inch thick particleboard with the exterior surface finished in VGS laminate as selected.
 - b. Exposed back on fixed or movable sink base cabinets: 3/4 inch thick moisture resistant particleboard with the exterior surface finished in VGS laminate as selected.
 - c. Flexible rail mounted cabinet backs: 3/4 inch thick particleboard structurally doweled into cabinet sides and top panels.
 3. All units have an individual factory-applied base, constructed of 3/4 inch thick plywood. Base is 96mm (nominal 4 inch) high unless otherwise indicated on the drawings.
 4. Base units, except sink base units: Full sub-top. Sink base units are provided with open top and a stretcher at the front, attached to the sides. Sink base units over 48" will have a subtop. Back to be removable panel.
 5. Side panels and vertical dividers shall receive adjustable shelf hardware at 32mm line boring centers. Exposed and semi exposed edges.
 - a. Edging: .5mm PVC.
 7. Adjustable shelf core: 3/4 inch thick particleboard up to 36 inches wide, 1 inch thick particleboard over 36 inches wide.
 - a. Front edge: .5mm PVC.
 8. Interior finish, units with open Interiors and units with glass doors:
 - a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with High pressure laminate laminate.
 9. Interior finish, units with closed Interiors:
 - a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with thermally fused melamine laminate.
 10. Exposed ends:
 - a. Faced with VGS high-pressure decorative laminate.
 11. Wall unit bottom:
 - a. Faced with thermally fused melamine laminate the same color as interior except open face cabinets will have HPL.
 12. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), are not permitted.
- D. Drawers:
 1. Sides, back and sub front: Minimum 1/2 inch thick particleboard, laminated with thermally fused melamine doweled and glued into sides. Top edge banded with .5mm PVC.
 2. Drawer bottom: Minimum 1/2 inch thick particleboard laminated with thermally fused melamine, fully encapsulated and glued to sides of drawer box.
 3. Paper storage drawers: Minimum 3/4 inch thick particleboard sides, back, and sub front laminated with thermally fused melamine. Minimum 1/2 inch thick particleboard drawer

bottoms fully encapsulated and glued to the sides of the drawer box. .

- E. Door/Drawer Fronts:
 - 1. Core: 11/16 inch thick particleboard.
 - 2. Provide double doors in opening in excess of 24 inches wide.
 - 3. Faces:
 - a. Exterior: VGS High-pressure decorative laminate.
 - b. Interior: High-pressure cabinet liner CLS.
 - 4. Door/drawer edges: 3mm PVC, external edges and outside corners machine profiled to 1/8 inch radius.
- F. Miscellaneous Shelving:
 - 1. Core material: 3/4 inch or 1 inch thick particleboard.
 - 2. Exterior: VGS High-pressure decorative laminate.
 - 3. Edges: 3mm PVC, external edges and outside corners machine profiled to 1/8 inch radius.

2.06 DECORATIVE LAMINATE COUNTERTOPS:

- A. Core:
 - 1. All countertops except at sink elevations: 1-1/8 inch thick ANSI A208.1-1993 M-2 particleboard.
 - 2. Countertops at sink elevations: 1 inch thick ANSI A208.1-1993 M-3 moisture resistant (MR) particleboard.
- B. Surface: HGS/HGP high-pressure decorative laminate with balanced backer sheeting.
- C. Edges, including applied backsplash: 3mm PVC, exposed edges and corners machine profiled to 1/8 inch radius.
- D. All countertops joints must be dry fit at the factory to check for consistency in color from one panel to the other and overall finished panel thickness, resulting in a high quality product easy to install.

Part 3 - Execution

3.01 INSPECTION:

- A. The casework contractor must examine the job site and the conditions under which the work under this section is to be performed, and notify the building owner in writing of unsatisfactory conditions. Do not proceed with work under this Section until satisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 SHIPPING

- A. Each cabinet shall be foam and shrink wrapped to ensure cabinet surfaces are protected until the time of installation. Blanket-wrap is not allowed because they do not stay with the cabinets after delivery and because they are not assured of being grease- and dirt-free.

3.03 PREPARATION:

- A. Condition casework to average prevailing humidity conditions in installation areas prior to installing.

3.04 INSTALLATION:

- A. Erect casework, plumb, level, true and straight with no distortions. Shim as required. Where laminate clad casework abuts other finished work, scribe and cut to accurate fit.
- B. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind.

- C. Repair minor damage per plastic laminate manufacturer's recommendations.

3.05 CLEANING:

- A. Remove and dispose of all packing materials and related construction debris.
- B. Clean cabinets inside and out. Wipe off fingerprints, pencil marks, and surface soil etc., in preparation for final cleaning by the building owner.

3.06 COLOR SELECTION:

- A. Laminate Color Selection:
 - 1. Select from Casework manufacturers standard range of colors from published color charts for cabinet faces, exposed ends, open interiors, and countertops. Thermally fused melamine laminate matched to White color.
- B. Hinge and Pull Color Selection:
 - 1. Select from your choice of stock colors matched to White, Almond, Gray, Black and Chrome. Other colors are available. Special order colors may impact cost and lead times.
- C. Miscellaneous Hardware Color Selection (support brackets, table frames, rail):
 - 1. Select from your choice of stock colors matched to White, Almond, Gray and Black.
- D. .5mm PVC Edge Banding Color Selection:
 - 1. Select from your choice of .5mm PVC stock colors matched to White, Almond, Gray and Black. Other colors are available*. Special order colors may impact cost and lead times.
- E. 3mm PVC Edge Banding Color Selection:
 - Select from your choice of 3mm PVC stock colors matched to White, Almond, Gray and Black. Other colors are available*. Special order colors may impact cost and lead times

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